



ANNUAL REPORT

FISCAL YEAR 2017

JULY 2017 – JUNE 2018

APN
ASIA-PACIFIC NETWORK FOR
GLOBAL CHANGE RESEARCH

About APN

The Asia-Pacific Network for Global Change Research (APN) is an intergovernmental network of 22 countries working towards pursuing an Asia-Pacific region that is successfully addressing the challenges of global change and sustainability.

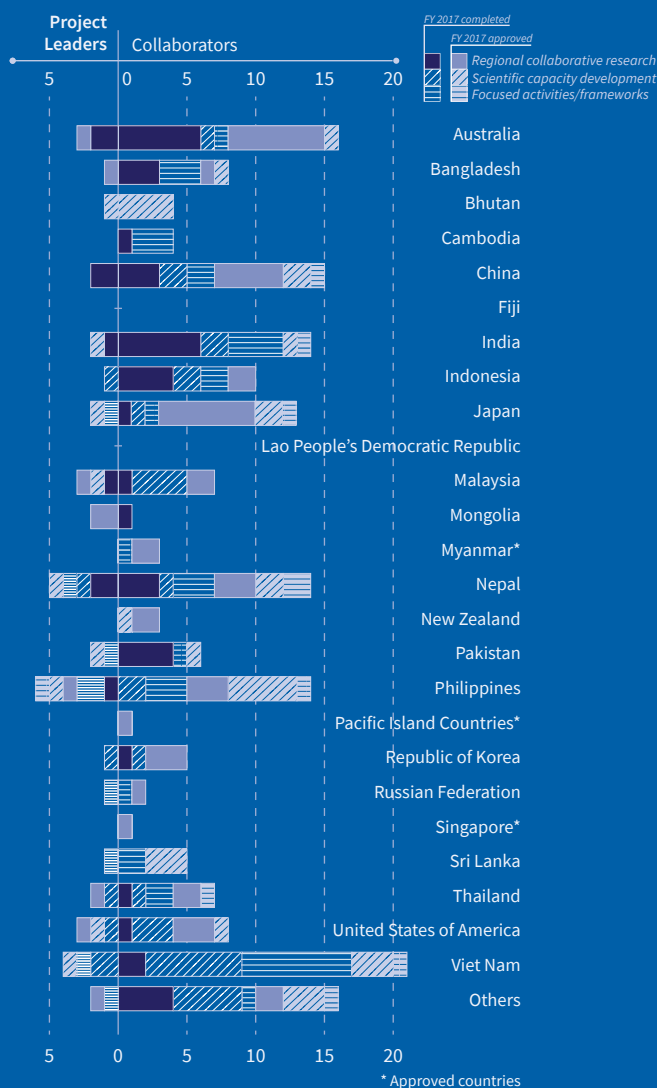
To achieve its mission, a set of programmes and activities are conducted.

- ☑ Fund regional, multi-country and transdisciplinary research projects on global change and sustainability that provides underpinning scientific input to policymaking.
- ☑ Fund and implement projects and workshops to develop the capacity of individuals and organizations to conduct high quality research on global change and sustainability.
- ☑ Foster and strengthen interactions between the science and policymaking communities to produce actionable science and informed decision-making.

Fiscal year 2017 at a glance

Member country involvement

Project leaders and collaborators involved in APN programmes, aggregated by programme and nationality.



RESEARCH & CAPACITY DEVELOPMENT

25 projects completed, involving 137 project leaders and collaborators.

EXTENSIVE NETWORK

2,100+ researchers, government officials, community members and practitioners directly involved in projects.

3,705 active subscribers to the APN mailing list.

INVOLVING YOUNG SCIENTISTS

320+ young scientists directly involved in projects.

76% percentage of projects reported involvement of young scientists.

KNOWLEDGE MANAGEMENT

798 publications produced and shared through the APN E-Library.

18,608 page views on the APN E-Library.

Climate Change and Variability

Toolkit helps communities nestling under the Himalayas in improving resilience to climate change impacts

EXTREME WEATHER EVENTS caused by climate change in the Himalayas are generating long-term effects on water, energy and food security. The Ramgarh watershed in Uttarakhand, India, is experiencing increases in temperature and changes in seasonality. These changes are causing adverse impacts on community health, especially among children and women who are frequently affected by waterborne diseases. Additionally, hydrological disasters such as flash floods and agricultural droughts are rising.

To strengthen the resilience of communities around the watershed, the project utilized the ICLEI Asian Cities Climate Change Resilience Network Process (IAP) to identify climate risks and vulnerabilities, and to develop adaptive measures. The project began by acquiring political support from the local government and community groups to use the IAP, which subsequently led to the formation of the Climate Core Team. The project also formed the Stakeholders Group that consists of citizen representatives from local organizations. The two groups then identified five fragile systems that require immediate attention.

- Availability and supply of drinking water and irrigation
- Road connectivity
- Community health and well-being
- Rural livelihood and economy
- Forest resources

The project conducted an assessment to understand the extent of vulnerability of each fragile system by developing a map that identifies the location of high risks and the people most vulnerable to these risks. The assessment revealed that Satbunga, Bohrakote, Naikana and Nathuwakhan villages face serious risks with poor households, women, vegetable and fruit producers, and tourist enterprises being affected the most. Additionally, adaptive capacity of the fragile systems were assessed against the parameters of economy, technology, governance, societal and ecosystem services, and revealed that economic ability is limited across all fragile systems.

An MOU was signed by the Ramgarh Watershed District Counsellor to implement the IAP. Government representatives and community decision-makers were actively involved through the entire project.

In response to the findings, over 40 adaptive measures across the fragile systems were developed. These measures include:

- Increase awareness of water conservation and revival of traditional water management strategies;
- Conduct geological mapping and surveys to identify road risks;
- Establish good medical facilities in



community health centres;

- Institutionalize sustainable forest management practices; and
- Ensure adequate food in forests to prevent animals from damaging field crops.

Eight young scientists from Kumaun University, Uttarakhand, India, were trained in using the IAP.

Consequently, adaptive measures were integrated into rural planning of the Ramgarh watershed management authority and are currently implemented. ■



PROJECT Development of an evidence-based climate change adaptation toolkit to help improve community resilience to climate change impacts in Uttarakhand, India **PROGRAMME** Collaborative Regional Research Programme (CRRP) **PROJECT LEADER** Dr Lance Clive Heath, Sustineo/Australian National University, Australia **ORGANIZATIONS INVOLVED** Kumaun University, India; ICLEI South Asia, India; Tribhuvan University, Nepal; Monsoon Asia Integrated Regional Study, China; Centre for Global Change, Bangladesh; Monash Sustainability Institute, Australia. **WEBSITE** www.apn-gcr.org/resources/items/show/1991



Rapid vulnerability assessments on climate change induced urban transportation infrastructure were conducted in Hoi An and Vinh Long in Viet Nam, Hua Hin and Samut Sakhon in Thailand, and Sihanoukville and Kampot in Cambodia.

PROJECT LEADER Dr Lam Vu Thanh Noi, Southern Institute of Water Resources Research, Viet Nam
WEBSITE www.apn-gcr.org/resources/items/show/1951

Biodiversity and Ecosystems

Stakeholders increase understanding on sustainable management of coastal ecosystems in Southeast Asia

THE THREATENING IMPACTS of climate change in coastal ecosystems are exacerbating existing pressures of overexploitation, land-use change and pollution with increased cyclones, droughts and floods. As a result, loss of coastal diversity is accelerating, and adverse impacts on human well-being are aggravating with increased incidences of malaria, dengue and cholera, etc. Conserving the habitat and biodiversity while maintaining livelihood and resilience is a prime task. However, developing effective management strategies for ecological conservation and sustainable management of coastal systems remains a challenge.

The project tested a capacity development model in a training-cum-workshop designed to create an enabling environment for sustainable management of coastal ecosystems, and a platform that connects researchers, development workers and government officials. The project also aimed to fill gaps between up-to-date scientific evidence and policy decisions through capacity development and dialogue.

The training session exchanged knowledge on policy implementation and experiences to understand the characteristics, ecology and functions of coastal ecosystems, and discussed the potential of Ecosys-

tem-Based Adaptation (EBA) as a management tool. Additionally, the training provided an exercise to develop the capacity of professionals to undertake monitoring, research and conservation of mangrove forests.

Thirty-one participants from government agencies, communities and private companies in Indonesia, Malaysia, Myanmar, Philippines, Thailand and Viet Nam increased their knowledge on sustainable management of coastal ecosystems.

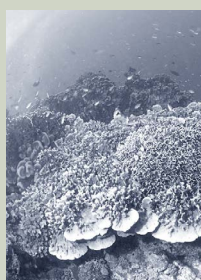
The multi-stakeholder workshop brought together representatives from government agencies, communities and private companies from Indonesia, Malaysia, Myanmar, Philippines, Thailand and Viet Nam. The dialogue discussed opportunities for regional cooperation in relation to Integrated Coastal Zone Management (ICZM), EBA, climate change adaptation and risk assessment, etc. Conclusively, the workshop developed a list of priorities to address the challenges of ecological conservation and sustainable management of coastal systems with specific focus on mangrove forests.



The project concluded by producing a regional scale synthesis of the status of coastal management in Southeast Asia with a focus on EBA, ICZM and the Sustainable Development Goals. Additionally, an online community of practice was created to disseminate knowledge and to increase interaction among strategic partners with the aim of developing a regional level base data on coastal management. ■



PROJECT Ecosystem-based adaptation approach for sustainable management and governance of coastal ecosystems **PROGRAMME** Scientific Capacity Development (CAPaBLE) **PROJECT LEADER** Dr Ngo Tho Hung, Asian Institute of Technology Center in Viet Nam, Viet Nam **ORGANIZATIONS INVOLVED** United Nations University Institute for Water, Environment and Health, Canada; Can Tho University, Viet Nam; Annamalai University, India; United Nations Environment Programme—International Ecosystem Management Partnership, China. **WEBSITE** www.apn-gcr.org/resources/items/show/2044



In the Midst of industrialization and rapid economic growth in countries surrounding the South China Sea, a study on the capacity of coastal coral reefs in responding and adapting to environmental change was conducted.

PROJECT LEADER Dr Tatiana N. Dautova, Russian Academy of Sciences, Russian Federation
WEBSITE www.apn-gcr.org/resources/items/show/2033



Capacity development on quantifying methods to assess spatiotemporal variability of net primary production in response to climate change and human activity in 1911–2011 was conducted in China, Mongolia, Pakistan and Uzbekistan.

PROJECT LEADER Prof. Jianlong Li, Nanjing University, China
WEBSITE www.apn-gcr.org/resources/items/show/1884

Land, Air and Urban Sustainability

Co-developed adaptation options supports adaptive groundwater management in urban Asia

OVER HALF of the world's population today lives in urban areas where major cities and municipalities rely either fully or mostly on groundwater as the source of water supply. It is predicted that strategic importance of groundwater for global water and food security will increase further as urban population continues to grow, and frequency and intensity of climate extremes sets to intensify.



To understand the implication of the changes on groundwater recharge systems, the project assessed current and future climate trends, and quantified changes in climatic drivers. The project also formulated adaptation options to reduce the vulnerability of groundwater resources in urban areas. Four cities with high groundwater dependency were selected as study sites: Bandung, Indonesia; Lahore, Pakistan; Bangkok, Thailand; and Ho Chi Minh City, Viet Nam.

State-of-the-art climate change analyses were conducted using four regional climate models to project the future climate in the four cities. The projection results were then used in estimating future groundwater recharge and vulnerability in each city. The study identified that, in line with rainfall projections, Bandung and Ho Chi Minh City are to experience a decrease in groundwater recharge, while Bangkok and Lahore are expected to see an increase in recharge rates.

adaptive strategies in response to various climatic projection scenarios. Consequently, a total of 23 adaptation options were formulated to increase the effectiveness of groundwater management in the four cities. ■



The project developed the capacity of policymakers to assess vulnerability of groundwater recharge systems through customization and application of models.

Based on the results of the analyses, the project organized two regional workshops and e-conferences, which developed the capacity of policymakers, scientists and local water users on: established methods for groundwater vulnerability quantification; different types of adaptation options and their suitability and limitations; and

PROJECT Adapting groundwater of Asian cities to climate change: bridging the science and policy interface **PROGRAMME** Scientific Capacity Development (CAPABLE) **PROJECT LEADER** Dr Sangam Shrestha, Asian Institute of Technology, Thailand **ORGANIZATIONS INVOLVED** Institute for Global Environment Strategies, Japan; Brawijaya University, Indonesia; International Waterlogging and Salinity Research Institute, Pakistan; Asian Institute of Technology, Thailand; Department of Groundwater Resources, Thailand; Division of Water Resources Planning and Investigation for the South of Viet Nam, Viet Nam. **WEBSITE** www.apn-gcr.org/resources/items/show/2042



Policy recommendations on mega-regional dynamics and environmental consequences on emerging urban regions in China and India were developed through the utilization of remote sensing data and geographic information systems.

PROJECT LEADER Assoc. Prof. Jeffery M. Sellers, University of Southern California, USA **WEBSITE** www.apn-gcr.org/resources/items/show/1893



Changes in future extreme rainfall patterns were analyzed in Japan, Thailand, and Viet Nam to identify alternative measures for stormwater capture, and to explore methods to increase urban water security.

PROJECT LEADER Dr Binaya Kumar Mishra, United Nations University Institute for Sustainability and Peace, Japan **WEBSITE** www.apn-gcr.org/resources/items/show/1972

Resource Utilization and Sustainability

An integrated solid waste management system to establish zero waste cities in Bhutan and Viet Nam

DUE TO RAPID population growth, urbanization and lifestyle changes, solid waste management (SWM) has become a severe environmental problem as the quantity of solid waste has increased while infrastructure for collection and treatment remains insufficient. Lack of knowledge, technical skills, financial resources and collaboration among stakeholders are aggravating the situation.

Guidelines in local language and English will assist local governments in selecting appropriate technologies for solid waste management based on local context.

The project aimed to increase the capacity of local stakeholders in identifying appropriate SWM to minimize the amount of waste going to landfills. Mongar, Bhutan, a growing city where the amount of waste generated per day exceeds the capacity of the existing landfill, and Ho Chi Minh City, Viet Nam, a megacity that is facing difficulties in meeting the needs of SWM due to the lack of finance, human resource, infrastructure, public awareness and law enforcement, were selected as implementation sites.

The steps adopted to implement the project are indicated below.

1. Training of trainers: Eight representatives from government agencies, universities and the private sector from the two cities were trained on waste management technologies, including waste separation at source, community-based SWM, composting facilities and waste-to-energy.

2. Baseline data collection: Data on characteristics and generation rate of waste, technology and infrastructure, policy and institutional framework, and financial mechanism were collected. The data revealed that public awareness on waste segregation at source is low in both cities, provoking the risk of contamination, especially in Mongar.

3. SWM option identification: Both cities showed opportunities in educational campaigns to raise awareness on reducing waste, recycling and segregation at source, and conversion of organic waste to fertilizers. Investment on green energy technologies are encouraged in Ho Chi Minh City.

4. Pilot project implementation: Six pilot projects on waste segregation at source and recycling were implemented, involving public and private sectors.

5. Guideline development: Guidelines were developed to assist local governments in selecting appropriate technologies for SWM. The guidelines provide major criteria and logical steps on how to select appropriate technologies.

Three awareness raising video clips on separation at source were broadcasted in Ho Chi Minh City.

Based on the findings, the project concluded that source segregation and effective recycling technologies to convert waste into valuable products are the solution to zero waste, and the combination of policy and technology as the key to success. ■



PROJECT Integrated solid waste management system leading to zero waste for sustainable resource utilization in rapid urbanized areas in developing countries **PROGRAMME** Collaborative Regional Research Programme **PROJECT LEADER** Dr Alice Sharp, Thammasat University, Thailand **ORGANIZATIONS INVOLVED** Ministry of Works and Human Settlement, Bhutan; Van Lang University, Viet Nam. **WEBSITE** www.apn-gcr.org/resources/items/show/1989



A Strategic assessment on common practices of agro-waste management including challenges of on-site burning, decreased quality of soil and utilization of biomass energy were conducted in Bhutan, India and the Philippines.

PROJECT LEADER Dr Dipayan Dey, South Asian Forum for Environment, India **WEBSITE** www.apn-gcr.org/resources/items/show/1947



An Operational framework to assess water security using Driver-Pressure-State-Impact-Response (DPSIR) Framework was applied in river basins and cities in India, Thailand and Viet Nam.

PROJECT LEADER Prof. Mukand S. Babel, Asian Institute of Technology, Thailand **WEBSITE** www.apn-gcr.org/resources/items/show/2013

Risk Reduction and Resilience

Toolbox enhances knowledge and capacity in assessing climate-induced loss and damage in India, Nepal and Pakistan

CLIMATE-INDUCED loss and damage is a consequence of inadequate mitigation and adaptation efforts, limited capacity and lack of funding. This is especially the case in developing countries, particularly at the local level. More data and knowledge is needed to understand and assess loss and damage, and to support policymakers in formulating adequate long-term solutions to reducing its impacts.

The project developed a toolbox for local-level assessment on loss and damage based on climate-related stressors by paying close attention to limitations and constraints on adaptation, as well as individual risk management strategies that people adopt to prevent or minimize disaster losses. The toolbox provides guidance on conducting: desk study; household questionnaire; participatory rural appraisal; expert interviews; story compilation; and participatory evaluation of activities related to adaptation and risk reduction. The toolbox also provides information on data entry and analysis, and on methods to report assessment findings and formulating recommendations.

A five-day workshop was organized for the principal investigators of three case studies that were subsequently conducted in India,

Policymakers from India, Nepal and Pakistan show great interest in working with members of the project to further strengthen their knowledge on loss and damage.

Nepal and Pakistan. The workshop provided an introduction on: the topic of loss and damage, and its importance in UNFCCC negotiations; specific research tools for assessing loss and damage; and how to use the toolbox. The workshop also trained the principal investigators in developing individual plans for conducting their research in each country. Upon receiving the training, the toolbox was tested, and generated data and findings on loss and damage on cyclones in India, landslides in Nepal and floods in Pakistan.

To deepen the impact of the project, the toolbox was further refined and disseminated at various international events. The toolbox was utilized in a workshop conducted as a side event at COP22 and COP23, and shared at the 5th Asia-Pacific Climate Change Adaptation Forum.

The toolbox is available at the UNU Collections at <http://collections.unu.edu/view/UNU:6032>. ■



Nine scientists from four countries received hands-on training on how to use the toolbox to enhance knowledge and capacity in assessing climate-induced loss and damage.



PROJECT Methods toolbox for assessing loss and damage at the local level **PROGRAMME** Climate Adaptation Framework (CAF) **PROJECT LEADER** Ms Hina Lotia, Leadership for Environment and Development, Pakistan **ORGANIZATIONS INVOLVED** United Nations University Institute for Environment and Human Security, Germany; All India Disaster Mitigation Institute, India; Integrated Development Society, Nepal; Leadership for Environment and Development, Pakistan. **WEBSITE** www.apn-gcr.org/resources/items/show/1944



Geospatial technology in mapping vulnerability to dengue fever over the Mekong River Delta region tested effective in Viet Nam.

PROJECT LEADER Dr Pham Thi Thanh Nga, Vietnam Academy of Science and Technology, Viet Nam
WEBSITE www.apn-gcr.org/resources/items/show/2014



Case studies on achievements and challenges in response to disasters caused by floods and tsunami in Cambodia, Indonesia, Thailand and Viet Nam identified successful long-term approaches in building resilience.

PROJECT LEADER Dr Frank Thomalla, Stockholm Environment Institute (Asia), Thailand **WEBSITE** www.apn-gcr.org/resources/items/show/1969

Scientific Capacity Development

Agrarian research-policy-technology personnel increases understanding on agricultural sustainability in Sri Lanka

IN FORMULATING agrarian policies in Sri Lanka, impacts on natural resource base caused by deforestation due to agricultural activities, indiscriminate use of pesticides and subsidized fertilizers, and overuse of water resources are understated. Social issues such as ageing population, poverty and health hazards in farming communities are neglected. On another front, changing climatic conditions are perpetuating the decline of farm production.

The project aimed to enhance the understanding of policymakers and relevant stakeholders on the economic, social and environmental dimensions of sustainable agriculture. As the first step, a capacity development workshop was held to develop the capacities of 40 researchers on impact assessment techniques for diverse farming options. Subsequently, research was conducted to assess the sustainability of food crop production systems (FCPSs) of maize, groundnut, green gram, red onion and sugar cane in the South East Dry Zone

of Sri Lanka. Additionally, a questionnaire was designed and distributed to develop sustainable indices of each of the selected FCPSs.

Twenty-five senior policymakers enhanced their understanding on sustainable agriculture and the need for scientific input in policy formulation.

The research led to organizing three events. The science-policy dialogue gathered scientists and policymakers representing different ministries dealing with agriculture, and provided a platform to discuss the necessity of scientific input in policymaking. In particular, the need for modernizing the farming sector, combating the impacts of climate change, and dealing with socio-cultural changes while ensuring food security through recent production drives were discussed. Fifty-six extension personnel were trained as farmer educationalists on sustainable agriculture and

to enable bottom-up policy formulation through collection of data from FCPSs. Easy-to-learn sessions were then organized by the extension personnel to educate 900 farmer representatives at their respective farming locations on problems caused by practical farming, and to raise awareness on impacts on agriculture caused by climate change.

Conclusively, the enhanced knowledge and skills gained through the activities have developed the competence of researchers in involving impact assessments in various governmental programmes. ■



PROJECT Capacity development of agrarian research-policy-technology personnel in Sri Lanka on "global change and sustainability" **PROGRAMME** Scientific Capacity Development (CAPaBLE) **PROJECT LEADER** Mrs. Priyanjanie Renuka Weerakkody, Hector Kobbekaduwa Agrarian Research and Training Institute, Sri Lanka **ORGANIZATIONS INVOLVED** University of Sri Jayawardenepura, Sri Lanka; University of Colombo, Sri Lanka. **WEBSITE** www.apn-gcr.org/resources/items/show/2041

Chasing butterflies in Beijing: butterflies as an indicator of urban biodiversity

NATIVE INSECTS provide important ecosystem services including pollination of plants, which provide food for humans and other animals. However, these important services proceed largely unnoticed and have received limited attention. Without knowing the diversity of insects in large cities, prediction on how future socioeconomic development could affect ecosystem services remains unclear.

*The project recorded the existence of *Danaus chrysippus* for the first time in northern China.*

The project selected butterflies as a model indicator and conducted biodiversity stud-

ies in 10 urban parks in Beijing. Data of 587 individual butterflies belonging to 31 species from five families were collected and developed into a DNA barcode reference library to enable rapid surveys in future studies. Additionally, the project investigated the distribution patterns of the butterflies, and examined the correlation between butterflies with other indicator species, such as birds and plants.

This is the first data collection of butterflies in Beijing and highlights the importance of monitoring butterflies in the long-term. It is hoped that using charismatic animals and plants like butterflies will increase the interest of the public on urban biodiversity conservation. ■

Six students from China and Viet Nam were trained in conducting social research methodology including survey approaches.



PROJECT Urban biodiversity and human well-being in Asia's megacities **PROGRAMME** Collaborative Research for Young Scientists (CRYS) Small Grant Pilot Programme **PROJECT LEADER** Dr Sing Kong Wah, Chinese Academy Sciences, China **ORGANIZATIONS INVOLVED** Naresuan University, Thailand; China Agricultural University, China; The University of Tokyo, Japan; Oxford University Clinical Research Unit, Viet Nam. **WEBSITE** www.apn-gcr.org/resources/items/show/2070

Events



Activities supported by the Hyogo Prefectural Government, Japan

In September 2017, APN supported the participation of two scientists from China to give presentations at the forum “Air Pollution Due to PM2.5 and its Health Effects—Reports from China and the Present Status in Japan”, organized by the Japan Society for Atmospheric Environment. President Lyu Xiaoming, Guangdong Association for Environmental Monitoring, reported on the improvement of air pollution in the Pearl River Delta and its main support technology, and Professor Guo Xinbiao, Peking University, presented on research findings on health effects caused by PM2.5 in China. The forum received approximately 160 participants.



In November 2017, APN and the Hyogo Prefectural Government jointly organized the Fourth Hokusetsu SATOYAMA International Seminar in Japan. The Seminar focused on domestic and international economic activities by using local natural resources from satoyama and satoumi, and small businesses that accommodate regional challenges. Four speakers from Taiwan, Indonesia and Japan gave presentations on their experiences in preserving satoyama and satoumi through sustainable tea production in Pinglin District, establishing an eco-resort to protect nature in Misool Island, producing firewood for boilers in Maniwa city, and using bamboo as biomass energy resource in Awaji island, respectively. Approximately 120 people from governments, universities, private companies, and volunteer groups participated.



International workshop on technology needs assessment on mitigation and adaptation

In February–March 2018, APN and the Institute of Natural Products Chemistry, Vietnam Academy of Science and Technology, jointly organized an international workshop in Viet Nam on technology needs assessment on climate change mitigation and adaptation in Southeast Asia. To support the Paris Agreement, the workshop focused on sharing experiences to enhance the transfer and deployment of technology, and disseminating information on other solutions to address climate change. Over thirty people from government ministries, international organizations, aid agencies, universities and private companies participated.



Proposal development training workshop

In March 2018, APN and the Institute of Natural Products Chemistry, Vietnam Academy of Science and Technology, jointly organized a proposal development training workshop in Viet Nam on disaster risk reduction and community resilience to climate change in vulnerable areas. Twenty-three young scientists identified four priority issues and developed research proposals with the aim of submission to the APN call for proposals. The identified priority issues are: water resources management in a changing climate; gap analysis of flood mitigation-related policies in Southeast Asia and its implementation; building resilience of urban poor in response to aggravating urban heat island effect; and use of sustainable livelihood approaches in disaster risk reduction.



Exploring regional approaches to climate-smart agriculture in South Asia

In April 2018, APN, SAARC Agriculture Centre and the Ministry of Environment, Forest and Climate Change, Government of India, jointly organized a regional expert consultation on policies, strategies and programmes for climate-smart agriculture in India. Experts from eight countries in South Asia discussed on how to effectively conduct regional research, and to take action on climate-smart agriculture to adapt to climate change and achieve food security. The consultation also raised awareness and generated input for the Koronivia Joint Work on Agriculture of UNFCCC.

Projects

APPROVED PROJECTS

Understanding the opportunities and challenges of compliance to building codes for disaster resilience in South Asia—the cases of Bangladesh and Nepal • Dr Iftekhar Ahmed, University of Newcastle, AUSTRALIA

Identification of wetland types in Bhutan with detailed documentation of carbon-rich wetlands • Mr Kuenzang Tshering, Royal Thimphu College, BHUTAN

Urban biodiversity and human well-being in Asia's megacities • Dr Sing Kong Wah, Kunming Institute of Zoology, Chinese Academy of Sciences, CHINA

Enhancing women farmer's adaptive capacity to address the challenges of climate change • Dr Rengalakshmi Raj, M. S. Swaminathan Research Foundation, INDIA

Effective models for payment mechanisms for forest ecosystem services in Papua New Guinea, Philippines and Thailand • Dr Jintana Kawasaki, Institute for Global Environmental Strategies, JAPAN

Fostering of the next generation of scientists for better understanding of air quality and regional climate change in Monsoon Asia and Oceania region • Dr Hiroshi Tanimoto, National Institute for Environmental Studies, JAPAN

COMPLETED PROJECTS

Development of an evidence-based climate change adaptation toolkit to help improve community resilience to climate change impacts in Uttarakhand, India • Dr Lance Clive Heath, Australian National University, AUSTRALIA

Improving the robustness, sustainability, productivity and eco-efficiencies of rice systems throughout Asia • Prof. Holger Meinke, University of Tasmania, AUSTRALIA

Assessing spatiotemporal variability of net primary production, net ecosystem productivity and carbon sinks of global grassland ecosystems in response to climate change in 1911–2011 • Prof. Jianlong Li, Nanjing University, CHINA

Coordinated regional climate downscaling experiment (CORDEX) in Monsoon Asia • Dr Ailikun, Chinese Academy of Sciences, CHINA

Rapid mapping technique for disaster observation and environmental change data acquisition • Prof. Dewayany Sutrisno, Indonesian Society for Remote Sensing, INDONESIA

Addressing non-economic losses and damages associated with climate change: Learning from the recent past extreme climatic events for future planning • Mr Yohei Chiba, Institute for Global Environmental Strategies, JAPAN

Climate change adaptation through optimal stormwater capture measures: towards a new paradigm for urban water security • Dr Binaya Kumar Mishra, United Nations University, JAPAN

Climate change vulnerability and adaptation in ground-water-dependent irrigation system in the Asia-Pacific region • Dr Shamsuddin Shahid, Universiti Teknologi Malaysia, MALAYSIA

Policy brief writeshop for researchers: An approach to promote greater science-policy interfacing in South Asia • Dr Khem Raj Dahal, The Small Earth Nepal, NEPAL

Multiple benefits assessment of the low emission development strategies in Asia-Pacific cities • Dr Hooman Farzaneh, Kyushu University, JAPAN

Climate change and biogenic emission impact on particulate and tropospheric ozone in Southeast Asia • Dr Justin Sentian, Universiti Malaysia Sabah, MALAYSIA

Climatogenic transformation of the alpine landscapes in Mongolian and Siberian Altai • Dr Otgonbayar Demberel, Khovd State University, MONGOLIA

Ecological vulnerability assessment for adaptation strategy formulation at different spatial scales in western Mongolia and China • Dr Suvdantsetseg Balt, Khovd State University, MONGOLIA

Rainwater harvesting for mitigating drought in western Nepal • Dr Jeeban Panthi, The Small Earth Nepal, NEPAL

Improving skills for promoting sustainable watershed management practices in South Asia • Dr Ghani Akbar, Climate Change, Alternate Energy and Water Resources Institute, PAKISTAN

Enhancing climate risk resilience through human security development and capacity development in the province of Aurora,

Runoff scenario and water-based adaptation strategies in South Asia • Dr Madan Lall Shrestha, The Small Earth Nepal, NEPAL

Climate-smart agriculture through sustainable water use management: Exploring new approaches and devising strategies for climate change adaptation in South Asia • Ms Nuzba Shaheen, Global Change Impact Studies Centre, PAKISTAN

Assessing the linkages between climate change adaptation, disaster risk reduction, and loss and damage: Case studies in the low-lying coastal cities of Cambodia, Indonesia, Philippines, Thailand and Viet Nam • Dr Rodel A. Lasco, The OML Center, PHILIPPINES

Influence of mangrove biodiversity on accumulation of carbon and resilience to sea level rise: A comparative assessment among disturbed, restored and intact mangrove systems • Dr Severino G. Salmo III, Ateneo de Manila University, PHILIPPINES

Integrated sustainability assessment of bioenergy potentials in Asia: An application of a hybrid approach on trade-offs and pathways • Prof. Damasa B. M. Macandog, University of Philippines, PHILIPPINES

Facilitating the attendance, interaction and training of young and developing nation scientists from Asia Pacific at the International Conference on Regional Climate—CORDEX 2016 • Dr Hyun-Suk Kang, Korea Meteorological Administration, REPUBLIC OF KOREA

Developing life-supporting marine ecosystems along East Asia's coasts: A synthesis of physical and biological data regarding coral reef ecosystems for the science-based management and socio-ecological policy making in terms of global sustainability • Dr Tatiana N. Dautova, Russian Academy of Sciences, RUSSIAN FEDERATION

An analysis of longer-term (5–10 years) recovery following major disasters in the Asia-Pacific

Philippines • Prof. Juan M. Pulhin, University of the Philippines Los Baños, PHILIPPINES

Multidimensional indicators of adaptive capacity of rice farming households to address salt water intrusion in the Philippines and Viet Nam • Dr Catherine Roween C. Almaden, Xavier University—Ateneo de Cagayan, PHILIPPINES

Sustainable mangrove rehabilitation for global and local benefits • Prof. Leni D. Camacho, University of the Philippines Los Baños, PHILIPPINES

Management strategy evaluation: Achieving transparency in natural resource management by quantitatively bridging social and natural science uncertainties • Prof. Eileen E. Hofmann, Old Dominion University, UNITED STATES OF AMERICA

Tracking influences of Asian urban GHG emissions for sustainability policies: Identifying low carbon pathways to meet the Paris Agreement • Dr Peter J. Marcotullio, City University of New York, USA

Using indigenous knowledge to enhance community resilience to climate change in mountainous region of Viet Nam • Dr Ho Ngoc Son, Agriculture and Forestry Research and Development Centre for Mountainous Region, VIET NAM

region: Lessons for resilient development • Dr Frank Thomalla, Stockholm Environment Institute—Asia Centre, THAILAND

Developing an operational water security index and its application in selected diverse regions of Asia • Prof. Mukand S. Babel, Asian Institute of Technology, THAILAND

Strengthening adaptive capacity of local agricultural communities through the development of a seasonal climate prediction system • Dr Patama Singhruck, Chulalongkorn University, THAILAND

Developing climate inclusive potential loss and damage assessment methodology for flood hazards • Dr Senaka Basnayake, Asian Disaster Preparedness Center, THAILAND

Understanding and quantifying the water-energy-carbon nexus for low carbon development in Asian cities • Dr Shobhakar Dhakal, Asian Institute of Technology, THAILAND

Towards new weather and climate baselines for assessing weather and climate extremes, impacts and risks over Southeast Asia • Prof. Roseanne D'Arrigo, Columbia University, UNITED STATES OF AMERICA

Capacity building for national, provincial stakeholders and local communities on loss and damage related to disaster risk reduction and climate change adaptation • Dr Le Minh Nhat, Department of Meteorology Hydrology and Climate Change, VIET NAM

Ecosystem-based adaptation approach for sustainable management and governance of coastal ecosystems • Dr Ngo Tho Hung, Asian Institute of Technology Centre in Viet Nam, VIET NAM

Scientific capacity building in climate change research techniques for non-governmental organizations in Viet Nam • Ms Than Thi Hien, Centre for Marine Life Conservation and Community Development, VIET NAM

Finances

APN receives financial contributions from: the Ministry of the Environment, Japan; Hyogo Prefectural Government, Japan; Ministry of Environment, Republic of Korea; and the Ministry for the Environment, New Zealand. In addition to direct financial contributions, APN receives significant in kind contributions from member countries, in particular the Hyogo Prefectural Government, Japan.

FINANCIAL RESOURCES OF FY 2017 (USD)

	Ministry of the Environment, Japan	1,778,000
Donor contributions FY 2017	Hyogo Prefectural Government, Japan	184,000
	Ministry of Environment, Republic of Korea	50,000
	Ministry for the Environment, New Zealand	20,000
	Balance brought forward from FY 2016 (including committed funds for multi-year projects)	1,110,934
Returned funds from completed projects and adjustments		110,984
Total		3,253,918

USE OF RESOURCES IN FY 2017 (USD) *

		<i>Executed and committed**</i>
Core programmes		1,500,786
Frameworks		381,258
Other scientific and policy activities		150,443
Institutional activities		121,039
Personnel, administration and operational costs		593,142
Total		2,746,668

* As of December 2018.

** The figures include executed expenditures for old and new projects and activities, as well as committed resources for multi-year projects.

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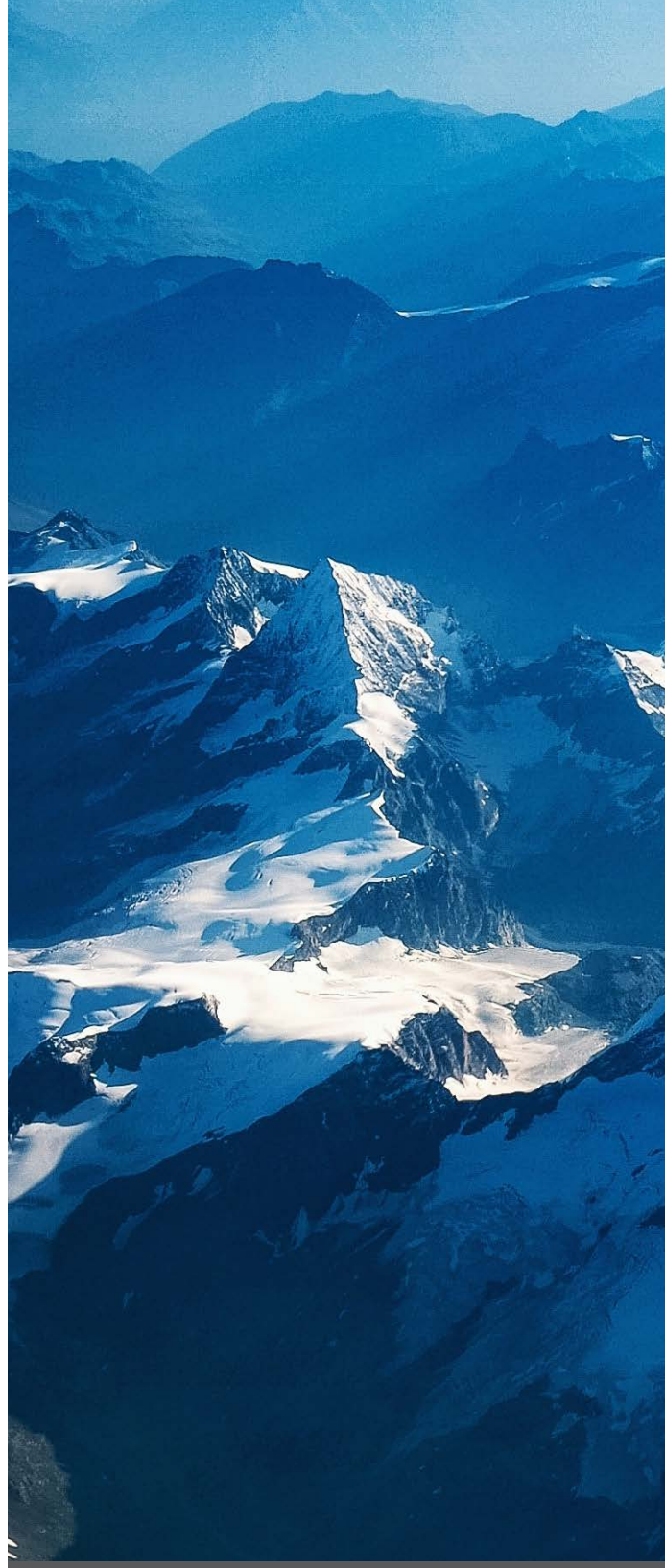
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* The list above contains current members of APN at the time of publication.



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